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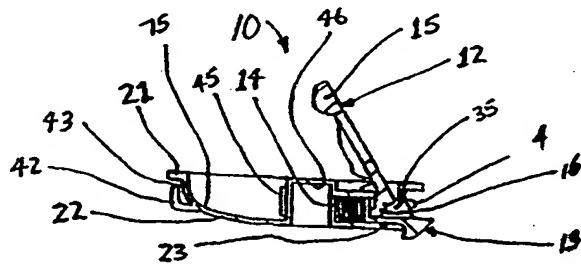
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(54) Title: LOAD FLOOR SLAM-ACTION PAWL LATCH



(57) Abstract

A closure panel latch (10) comprises a housing, a handle (12) pivotally connected to the housing, a pawl member (13) which slides along tracks provided in the housing and a spring (14) which biases the pawl into engagement with a keeper member. The handle includes a tab portion (16) which engages with the pawl to retract the pawl against the bias of the spring member to release the latch when the handle is lifted. The latch is closed by slam action and includes mounting elements on the housing for mounting the latch to a closure panel.

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LOAD FLOOR SLAM-ACTION PAWL LATCH

CROSS REFERENCE TO RELATED APPLICATIONS

5 This application is a continuation of U.S. Application No. 09/163,254 filed September 30, 1998 and claims priority from U.S. Application No. 60/110,384 filed December 1, 1998.

BACKGROUND OF THE INVENTION

10 1. Field of the Invention
The present invention relates to the field of latches and more particularly to slam action latches in which a handle is lifted to release the latch from engagement.

2. Brief Description of the Prior Art

15 Slam-action latches are known in the art and are employed in a number of applications. Generally, latches coming within this category operate by forcing a pawl into engagement with a keeper. For example, where a first panel member has a pawl and a second panel member, such as, for example, a cabinet, has a keeper thereon, slamming shut the first panel member against the second panel member secures the panels.

20 In many cases, floor compartments of vehicles need to be secured so that when the vehicle is operating, the floor panel will not become detached. A loose or detached panel can cause the compartment contents to escape and further can damage the panel and floor if repeated slamming of the door panel and frame occurs. A floor panel generally covers areas or compartments which must be readily accessed for maintenance and storage purposes. A latch is needed which will secure a floor panel upon closing the panel and which can be readily actuated to release the floor panel to thereby provide access to the area below the panel.

SUMMARY OF THE INVENTION

30 The present invention provides a latch having a housing which holds a handle, a pawl member and a spring which biases a pawl into engagement with a keeper member. The latch handle retracts the pawl from engagement with a keeper member by engaging the pawl. As the handle is lifted it pivots relative to the housing to engage the pawl and draw the pawl away from the keeper member. The pawl is retracted against the bias of the spring

member. When the handle is released, the spring member then returns the pawl to its engaging position.

The latch can be closed by slamming the panel to which it is mounted shut. Alternately, the handle can be lifted to move the pawl out of the way of the keeper while 5 the panel is closed, and then the handle can be released to allow the pawl to extend so as to be engaged by the keeper member.

The housing preferably provides a gripping area or recess for facilitating grasping of 10 the handle by a user. The housing can further provide a barrier to the compartment covered by the floor panel so that no objects inadvertently fall into the compartment through the latch.

It is a primary object of the present invention to provide a latch which is useful for securing a first panel or member to a second panel or member.

It is another object of the present invention to provide a latch which can be used in an installation where the latch is mounted on a closure panel to regulate entry into an 15 enclosure covered by the closure panel and provide a barrier to prevent a user's hand or fingers, or objects, from inadvertently entering the compartment.

Another object of the present invention is to provide a novel latch which can secure one or more panels or members together, for release upon actuating a handle of the latch.

Another object of the present invention is to accomplish the above objects by 20 providing a spring-biased latch which can be closed by slam-action.

Another object of the present invention is to provide a latch which can be used in connection with panels of automobiles, such as, for example, a floor panel, to regulate access to and from an area or compartment.

Another object of the present invention is to provide a novel latch which can be 25 constructed from few components.

Another object of the present invention is to provide a latch which can be mounted to a closure panel by snap-fitting a housing into a panel cut-out.

Another object of the present invention is to provide a detent mechanism for holding the handle in a preferred position relative to the housing.

Another object of the present invention is to provide a drag mechanism for 30 imparting a resistance to the handle when it is pivoted.

Another object of the present invention is to accomplish the above objects where a single spring element is used to bias the pawl into a latching engagement with a keeper and to bias the handle into a closed position.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

Fig. 1 is a left side, parallel perspective view of a latch of a load floor slam-action pawl latch according to the present invention, viewed from the top left.

5 Fig. 2 is a top plan view of the latch shown in Fig. 1.

Fig. 3 is a front elevation view of the latch according to the present invention.

Fig. 4 is a rear front elevation view of the latch according to the present invention.

Fig. 5 is a left side elevation view of the latch according to the present invention.

Fig. 6 is a bottom plan view of the latch according to the present invention.

10 Fig. 7 is a top plan view of the housing of the latch shown in Figs. 1-6.

Fig. 8 is a left side, parallel perspective view of the latch housing shown in Fig. 7, viewed from the top.

Fig. 9 is a left side, parallel perspective view of the pawl member of the latch shown in Figs. 1-6.

15 Fig. 10 is a rear elevation view of the pawl member shown in Fig. 9.

Fig. 11 is a left side, parallel perspective view of the handle of the latch shown in Figs. 1-6.

Fig. 12 is a bottom plan view of the handle of the latch shown in Figs. 1-6.

Fig. 13 is a front elevation view of the handle of the latch shown in Figs. 1-6.

20 Fig. 14 is a sectional view taken along the line 14-14 of Fig. 2.

Fig. 15 is a sectional view of the latch of Fig. 14, but shown with the handle raised and the pawl retracted.

Fig. 16 is a top plan view of a second alternate embodiment of a housing according to the present invention.

25 Fig. 17 is left side, parallel perspective view of the second alternate housing embodiment of Fig. 16, viewed from the top.

Fig. 18 is a top plan view of a third alternate embodiment of a housing according to the present invention.

Fig. 19 is a rear elevation view of the housing shown in Fig. 18.

30 Fig. 20 is a left side elevation view of the housing shown in Fig. 18.

Fig. 21 is a front elevation view of the housing shown in Fig. 18.

Fig. 22 is a right side elevation view of the housing shown in Fig. 18.

Fig. 25 is a top plan view of a second alternate embodiment of a handle according to the present invention.

Fig. 26 is rear elevation view of the handle shown in Fig. 25.

Fig. 27 is a left side elevation view of the handle shown in Fig. 25.

Fig. 28 is a front elevation view of the handle shown in Fig. 25.

Fig. 29 is a right side elevation view of the handle shown in Fig. 25.

5 Fig. 30 is a bottom plan view of the handle shown in Fig. 25.

Fig. 31 is a perspective of the handle shown in Fig. 25.

Fig. 32 is a top plan view of a second alternate embodiment of a pawl according to the present invention.

Fig. 33 is a rear elevation view of the pawl shown in the Fig. 32.

10 Fig. 34 is left side elevation view of the pawl shown in Fig. 32.

Fig. 35 is a front elevation view of the pawl shown in Fig. 32.

Fig. 36 is right side elevation view of the pawl shown in Fig. 32.

Fig. 37 is a bottom plan view of the pawl shown in Fig. 32.

Fig. 38 is a perspective view of the pawl shown in Fig. 32.

15 Figs. 39 through 45 represent similar views corresponding to Figs. 32 through 38, but show a third alternate embodiment of a pawl member according to the present invention.

Fig. 46 is a top plan view of a second alternate embodiment of a load floor slam-action pawl latch according to the present invention.

20 Fig. 47 is a longitudinal left side sectional view of the latch of Fig. 46 taken along the line B-B of Fig. 46.

Fig. 48 is a longitudinal right side sectional view of the latch of Fig. 46 taken along the line A-A of Fig. 46.

Fig. 49 is a top plan view separate view of the housing of the latch shown in Fig. 48.

25 Fig. 50 is a parallel perspective view of the housing shown in Fig. 49, as viewed from the top right.

Fig. 51 is a bottom plan separate view of the handle of the latch of Fig. 48.

Fig. 52 is a left side elevation view of the handle shown in Fig. 51.

Fig. 53 is a parallel perspective view of the pawl member of the latch shown in Fig.

30 48, shown in separate view.

Fig. 54 is a right side elevation view of the pawl member shown in Fig. 53.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Reference being made to Fig. 1, where a load floor latch 10 according to the present invention is shown comprising a housing 11, a handle 12, and a pawl 13. A biasing member, such as, for example, the spring 14 (Figs. 14 and 15), is provided to bias the pawl 13 into a forward position so that it can engage a keeper member (not shown).

The handle 12 includes a gripping portion 15, configured as a ring, and includes engaging means for engaging the pawl member 13. Preferably, as shown in Figs 11-13, the engaging means is provided as a tab 16 extending downwardly from the handle body 17.

As shown in Figs. 1 and 2, the housing 11 is provided with a mounting flange 21 which is attached to the housing body 22. The housing body 22 retains the pawl 13, the handle 12 and the spring 14 (Figs. 14 and 15). There is a pawl slot 23 provided in the housing 11, shown best in Fig. 8. The pawl member 13, as best shown in the cutaway views in Figs. 14 and 15, slides in the pawl slot 23 when the pawl member 13 is retracted from engagement with a keeper member and when the pawl 13 is returned to its extended position (Fig. 14) through the bias of the spring 14. The pawl slot 23 includes guide means for guiding the pawl member 13. Preferably, the guide means is shown comprising elongated slots 25, 26 provided on opposition lateral sides of the pawl slot 23.

Referring to Figs. 9 and 10, the pawl member 13 is provided with aligning means shown comprising the rail members 27, 28 which are received, respectively, in the guide slots 25, 26 of the housing 11. The pawl member 13 further includes an engaging foot 30 for engaging a keeper member. Spring holding means is provided comprising a retaining bore 31 is disposed in the rear of the pawl member 13 for receipt of an end of the spring 14 therein to retain the spring 14 when the latch 10 is assembled and operated so that there is a biasing of the pawl 13 toward its extended (latching) position. The pawl member 13 further includes an engaging slot 32 disposed in the top portion of the pawl body 33. The engaging slot 32 has a rear wall 34, a right sidewall 35, a left sidewall 36 and a floor 37. The rear wall 34 is provided to be engaged by the tab 16 of the handle 12 when the handle 12 is moved from its latched or horizontal position (Figs. 1 and 14) to its lifted, unlatching position (Fig. 15).

The housing 11 further includes mounting means for mounting the housing 11 on a panel (not shown). Preferably, the mounting means can comprise retaining members provided on the housing 11 which permit the housing 11 to be installed in a panel cut-out or opening. The mounting means is shown comprising retaining elements 40, 41 extending

outwardly from the housing body 22 and spaced apart from the housing flange 21. The mounting means further comprises a holding element 42 provided on the rear of the housing 11, as best shown in Figs. 5 and 6. The holding element 42 is preferably flexible and has a notched upper edge 43 to facilitate receipt of a panel (not shown) between the upper edge 43 of the element 42 and the underside of the housing mounting flange 21. The housing 11 is preferably installed by inserting the leading edge with the retaining elements 40, 41 into the cut-out, and then lowering the rear of the housing 11 so that the holding element 42 snaps over the panel to retain the assembly in place. The mounting means alternately, or 5 additionally, can comprise mounting elements which extend downwardly from the mounting flange 21 or housing body 22. Screws, rivets, barbs and other suitable mounting elements can also be employed to attach the housing to a closure panel.

10 Referring to Figs. 7 and 8, the housing 11 further includes handle-supporting means for supporting the handle 12 thereon. The handle supporting means is shown comprising support elements 44, 45 extending from the housing hub member 46 and being positioned 15 to support the handle 12 thereon. Further handle supporting means can comprise the indented portions 47, 48 which facilitate seating of the handle 12 thereon.

12 The handle 12 actuates the latch 10 by engaging the pawl 13. The handle 12 is retained on the housing 11 by a pivotal connection thereto. As shown in Fig. 12, the handle 12 contains pivot members 50, 51 extending outwardly therefrom. The pivot members 50, 20 51 are received in respective pivot recesses 52, 53 provided in the housing (Fig. 8) to permit the handle 12 to be held by the housing 11 and lifted to operate the latch 10. Preferably, the pivot members 50, 51 are tapered to facilitate snap-fit installation into the housing 11. Stop means as provided for stopping the lifting movement of the handle 12 when the latch is 25 operated. The stop means is shown comprising stop members 55, 56 on the front of the handle 12, as shown best in Fig. 13 which engage with the housing stops 57, 58 to limit the lifting of the handle 12 to a maximum position. Alternately, the stop means can be employed by having the handle body 17 engage the housing 11. Furthermore, the handle tab 16 can be configured to be stopped with the element 69 provided on the housing 11.

30 Supporting elements 62, 63 are preferably provided on the underside of the handle 12, as shown in Figs. 11- 13. The supporting elements 62, 63 are shown having an arcuate shape for enabling the handle 12 to pivot when it is lifted, while providing support for the front of the handle 12 when the latch is closed. The housing 11 is provided with seats 66, 67 (Figs. 7 and 8) on which the supporting elements 62, 63 of the handle 12, respectively,

are supported when the latch 10 is closed. Preferably, the supporting elements 62, 63 are radially configured members which extend from the handle body 17.

Referring to Figs. 16 and 17, an alternate housing 111 is shown. This housing 111 can operate similar to the housing 11 described above. The alternate housing 111 provides bearing seats 112, 113 which support the handle supporting elements 62, 63. A plurality of strengthening ribs 114, 115, 116, 117, 118 and 119 are provided on the housing 111. Handle stop means is also preferably provided on the housing 111. The handle stop means is shown comprising stop elements 121, 122 which are provided to be engaged by the respective stop members 55, 56 of the handle 12. The stop elements 121, 122 limit the lifting of the handle 12, and stop the swing of the handle 12 when a maximum position has been reached.

Grip facilitating means can also be provided on the handle 12, shown best in Fig. 13, comprising an extended or thicker portion 70.

The latch 10 preferably comprises barrier means for guarding against inadvertent access to the compartment being covered by the closure panel (not shown) to which the latch 10 is mounted. The barrier means preferably comprises a lower surrounding flange portion 75 which is provided as a portion of the housing 11 in the area below the handle 12. The surrounding flange 75 is spaced from the handle gripping portion 17 to provide adequate access for gripping the handle 12, while providing a barrier to items, debris, and the like from passing through the latch assembly 10 to the closure compartment (not shown). The surrounding flange 75 further prevents inadvertent entry of a user's fingers or hand into the closure compartment when the latch 10 is actuated.

While not shown, it is also conceivable that a lock can be utilized with the present latch. For example, a lock cylinder may be integrated with the housing 11 to prevent the handle or pawl movement to take place when locked. This could be achieved, for example, with a lockplug. For example, the lockplug can be installed in the handle 12 or housing 11 to selectively secure the handle 12 to the housing 11 to prevent relative movement thereof and thereby prevent the latch 10 from being opened.

In Figs. 18-38 are illustrated the components of another embodiment of a load door latch in accordance with the present invention. For the sake of brevity, only portions of the present embodiment which differ from the load floor latch 10 will be described herein.

In Figs. 25-31 is illustrated a handle 212. As illustrated in the bottom plan of Fig. 30, the handle 212 includes coring within its bottom surface 240, which operates to reduce the amount of material required for manufacture of this component. As should be

understood, while a specific geometry of coring is illustrated in Fig. 30, any desired geometry can be provided for the same purpose. In addition, as illustrated in Fig. 30, the handle 212 as compared with the handle 12 does not incorporate the features of the members 55 and 56 and supporting elements 62 and 63 which have been eliminated.

5 In Figs. 18-24 is illustrated a housing 211 of the present embodiment. As illustrated in the bottom plan view of Fig. 23 and the perspective view of Fig. 24, the housing 211 includes a plurality of coring depressions 250 within its upper and lower surfaces, which operate to reduce the amount of material for this component and accordingly also the weight. As should be understood, the number and configuration of the depressions 250 can 10 be adjusted where desired. In addition, as illustrated in the perspective view of Fig. 24, a step 252 is provided within the upper surface in order to increase the retention force on the handle 212 on assembly. The housing 211 also includes a cutout 254 generally rectangular in shape in its embodiment adjacent to its front end, as best illustrated in Fig. 24. In the present embodiment, the cavity 254 operates to provide additional clearance for the pawl, 15 as will be described below.

In Figs. 32-38 is illustrated a pawl member 213. As illustrated in Figs. 32 and 33, the pawl 213 includes spring holding means which comprises a projection 231 rather than the retaining bore 31 in the load floor latch 10 onto which is received the spring 14 on assembly. As illustrated in Fig. 34, the engaging foot 230 includes an angled upper surface 260 which provides additional clearance in operation when engaging the keeper. As illustrated in Fig. 35, a series of coring cavities 262 are provided, although as should be understood the number, shape and location of the coring cavities 262 can be varied where desired. As illustrated in Fig. 33 and perspective view of 38, support ribbing 264 is included which operates to provide increased stiffness. As illustrated in Fig. 34, the 20 engaging foot 230 is longer in length than the engaging foot 30 of the pawl member 13. In addition, due to the increased length of the engaging foot 230 in the present embodiment, the cavity 254 in the housing 211 is included in order to provide additional clearance for the pawl 213. Further, a cut-out 266 is provided in the pawl 213 into which the end of the handle is received in operation, which provides for increased pivotal movement of the 25 handle 212 as well as increased clearance between the handle 212 and pawl 213. Finally, the pawl member 213 includes a taper 268 added to the engaging foot 230, which operates to assist in providing proper latching engagement where misalignment of the panels can occur.

Another embodiment of the pawl member is illustrated in Figs. 39-45. The pawl member 313 is identical to the pawl 213 except the engaging foot 330 is of the same length as the engaging foot 30 of the pawl member 13.

Reference now being made to Fig. 46, where a second alternate embodiment of a load floor latch 400 according to the present invention is shown comprising a housing 411, a handle 412, and a pawl 413. A biasing member, such as, for example, the spring 414 (Fig. 47), is provided to bias the pawl 413 into a forward position so that it can engage the keeper member (not shown), to function similar to the latch embodiments described above.

The handle 412, similar to the handle 12 described above in connection with the embodiment shown in Fig. 1, includes a gripping portion 415, configured as a ring, and engaging means for engaging the pawl member 413. Preferably, as shown in Fig. 47, the engaging means is provided as a tab 416 extending downwardly from the handle body 417.

As shown in Figs. 46-48, the housing 411 is provided with a mounting flange 421 which is attached to the housing body 422. The housing body 422 retains the pawl 413, the handle 412 and the spring 414 (Figs. 46 and 47). There is a pawl slot 423 provided in the housing 411, shown best in Fig. 47. The pawl member 413 slides in the pawl slot 423 when the pawl member 413 is retracted from engagement with a keeper member (when the handle 412 is lifted) and when the pawl 413 is returned to its extended position through the bias of the spring 414. The pawl slot 423 includes guide means for guiding the pawl member 413. Preferably, the guide means as shown in Fig. 50, comprising elongated slots 425, 426 provided on opposite lateral sides of the pawl slot 423.

Referring to Figs. 53 and 54, the pawl member 413 is provided with aligning means shown comprising the rail members 427, 428 which are received, respectively, in the guide slots 425, 426 of the housing 411 (Fig. 50). The pawl member 413 further includes an engaging foot 430 for engaging a keeper member. The engaging foot 430 can comprise an angled upper surface 460 similar to that 260 described above in connection with the embodiment shown in Figs. 32-38. In addition, the engaging foot may comprise other configurations (not shown) suitable for engagement with a corresponding keeper member. Spring holding means is provided comprising a rear wall 431 of the pawl member 413 having a slot 431a disposed therein for receipt of an end of the spring 414 to retain the spring 414 when the latch 400 is assembled and operated so that there is a biasing of the pawl 413 toward its extended (latching) end position.

Preferably, the spring 414, as shown in Fig. 47, overlaps the rearwall 431 to connect with the pawl 413. The pawl member 413 further includes an engaging slot 432 disposed in

the top portion of the pawl body 433. The engaging slot 432, is defined by the rearwall 431, a right sidewall 435, a left sidewall 436 and a floor 437. The rearwall 431 is provided to be engaged with the handle tab 416 when the handle 412 is moved from its latched or horizontal position to its lifted, unlatching position.

5 The housing 411 further includes mounting means for mounting the housing 411 on a panel (not shown). Referring to Fig. 50, the mounting means can comprise retaining elements 440, 441 extending outwardly from the housing body 422 and spaced apart from the housing flange 421, and including a holding element 442 (Fig. 47). The holding element 442 is preferably flexible and has a notched upper edge 443, and functions similar 10 to the holding elements 42, 43 described above in connection with the first embodiment of the latch. In addition, as mentioned above, alternate mounting means, such as screws, rivets, barbs and other suitable mounting elements can also be employed to attached the housing to a closure panel.

15 Referring to Fig. 49, the housing 411 further includes handle-supporting means comprising support elements 444, 445 for supporting the handle 412 thereon. Further handle-supporting means can be provided and may comprise different configurations suitable for supporting the handle 412.

20 Referring to Figs. 51 and 52, the handle 412 is shown containing mounting means for pivotally mounting the handle 412 on the housing 411. The mounting means is shown preferably comprising pivot members 450, 451 provided on the handle 412. Corresponding housing pivot members 452, 453 provided on the housing 411 (Fig. 50) permit the handle 412 to be pivotally connected to the housing 411 and lifted to operate the latch 400. The pivot members 450, 451, for example, can comprise tapered elements for facilitating snap-fit installation on the housing 411. For example, one of the housing 411 and the handle 412 25 can have male members and the other of the housing 411 and handle 412 can have female members to form a pivotal relationship and connect the handle 412 and housing 411. Stop means can preferably be provided for stopping the lifting movement of the handle 412 when the latch 400 is operated. The stop means can comprise stop members 455, 456 shown on the underside of the handle 412, as shown best in Fig. 51. The stop members 30 455, 456 preferably function the same as those 55, 56 described above in connection with the first latch embodiment. Alternate stop means can be employed as described above in connection with the other embodiments of the latch shown herein.

In addition, a plurality of supporting elements can be provided on the underside of the handle 412 (Fig. 51) which provides support for the front of the handle 412 when the

latch is closed. Preferably, as shown in Fig. 47, the spring 414 connects with the pawl 413 and the handle tab 416. This spring connection facilitates biasing of the pawl 413 into a latching position and the handle 412 into a closed position.

As shown in Figs. 51 and 52, detent means is provided for detaining the handle in a preferred (fully closed) position over the handle pivot range, and drag means provided increasing resistance as the handle 412 is pivoted from its closed position, through its pivot range, to an open position. The detent means is shown preferably comprising radial elements 470, 471 each with an axial groove 472, 473 disposed, respectively, therein. Fig. 48 shows the latch 400 with the detent means positioning the handle 412 in a preferred closed position. The detent means preferably facilitates holding of the handle 412 against rattling when vibration forces are encountered. The housing 411 has boss elements 480, 481 which are provided to engage each axial groove 472, 473, respectively, to position the handle 412 in a predetermined preferred position. The lifting force applied to the handle 412 by a user can overcome the detent means and free the handle 412 for pivoting.

10 Preferably, the boss element 480 is provided having a resilient configuration, such as being disposed with a spring leg 481 of the housing 411. The detent bosses 480, 481 preferably engage with the corresponding radial elements 472, 473, respectively, when the handle 412 is pivoted throughout its pivot range. This engagement between the bosses 480, 481 and radial elements 472, 473 provides a drag or resistance to the pivoting of the handle 412.

15

20 Although shown in Fig. 50, though not described in detail herein in connection with the latch embodiment shown in Figs 46-54, it will be understood that the housing can include features shown and described above in connection with alternate embodiments of the latch shown in the previous Figs. 1 through 45. For example, alternate pawl members, as shown and described herein in accordance with the present invention may be employed with the second alternate latch embodiment 400. The housing 411 can also include features which permit the handle to rest on the housing 411.

25

30 Other modifications to the above description can be made consistent with the spirit and scope of the invention disclosed as disclosed in the Summary of the Invention, the Brief Description of the Drawing Figures, and the Detailed Description of the Preferred Embodiments.

While the above description constitutes the preferred embodiment of the present invention, it will be appreciated that the invention is subject to modification, variation and change, without departing from the proper scope or fair meaning of the present invention. In this regard, while the various features of the present invention have been shown and

described in relation to a floor panel, such as for example that of a vehicle, it will be understood that many of these features are suitable in connection with latching of other members.

What is claimed is:

1. A slam-actuated pawl latch assembly for securing a closure panel, wherein a pawl engages a keeper member, the latch assembly comprising:
 - a) a housing having a pawl slot therein;
 - b) a handle pivotally connected to said housing;
 - c) a pawl member disposed in said pawl slot; and
 - d) biasing means for biasing the pawl member to protrude outwardly from said pawl slot;
 - e) wherein said handle includes means for engaging said pawl member and retracting said pawl member inwardly toward the housing when the handle is pivoted.
 - 10 f) wherein said handle comprises a body portion with a lifting portion connected thereto to facilitate lifting of said handle by a user, and wherein said means for engaging said pawl member comprises a tab portion extending downwardly from said handle body portion;
 - 15 g) wherein said pawl member includes a receiving slot therein for receiving the handle tab portion therein, said receiving slot being defined in part by a wall portion, wherein said tab portion engages said wall portion to draw said pawl member inwardly toward the housing;
 - h) wherein said pawl slot of said housing includes secondary slot means for guiding said pawl member movement within said housing, and wherein said pawl member has a pair of rail members, each being disposed laterally on opposite sides of said pawl member receiving slot for travel through said housing secondary slot means when said latch is latched and unlatched; and
 - 20 i) wherein said handle tab portion is disposed for engagement with the pawl member in an area between said rail members.
2. The latch assembly of claim 1, wherein said handle comprises a body portion with a lifting portion connected thereto to facilitate lifting of said handle by a user, and wherein said means for engaging said pawl member comprises means retaining said pawl member in said latch assembly.
- 30 3. The latch assembly of claim 2, wherein said engaging means comprises a tab portion extending downwardly from said handle body portion.
4. The latch assembly of claim 3, wherein said pawl member includes a receiving slot

therein for receiving the handle tab portion therein, said receiving slot being defined in part be a wall portion, wherein said tab portion engages said wall portion to draw said pawl member inwardly toward the housing.

5. The latch assembly of claim 4, wherein said pawl slot of said housing includes secondary slot means for guiding said pawl member movement within said housing, and wherein said pawl member includes rail members disposed laterally on said pawl member for travel through said housing secondary slot means when said latch is latched and unlatched; wherein said handle is pivotally connected to said housing to pivot along a pivot axis and wherein said tab portion is disposed on said handle body at a location radially offset from said pivot axis.

10. The latch assembly of claim 1, wherein said housing further comprises handle supporting means including supporting elements provided on the housing.

15. The latch assembly of claim 1, wherein said housing further comprises mounting means for attachment of said latch to a closure panel; wherein said housing has a front wall and wherein said pawl slot is disposed in said housing front wall, wherein said pawl member extends outwardly through said pawl slot, and wherein said mounting means includes mounting elements disposed on said front wall.

20. The latch assembly of claim 7, wherein the latch is provided for installation in an opening provided in the closure panel, the opening being defined by an edge thereabout, wherein said housing further comprises a mounting flange and wherein said mounting means includes mounting elements extending from said housing disposed below said mounting flange for attachment of said latch assembly to a closure panel.

25. The latch assembly of claim 8, wherein said mounting elements comprise a pair of outwardly protruding members disposed on said housing on opposite sides of said pawl slot and a spring element provided on the rear of said housing, said spring element having a first end attached to said housing and a second end having a notch for engagement with the edge of the closure panel opening.

30. The latch assembly of claim 9, wherein said pawl member further includes an engaging foot for engagement with a keeper member.

11. The latch assembly of claim 1, wherein the housing further comprises a surrounding flange disposed below the handle.

12. A slam-actuated pawl latch assembly for securing a closure panel, wherein a pawl engages with a keeper provided on an adjacent surface, the latch assembly comprising:

- a) a housing having a slot therein with a central opening and having a

channel on each side of said central opening, said channels each communicating with said central opening;

- 5 b) a handle having a gripping portion, a body, pivot ends for pivotally connecting said handle to said housing, and a tab portion extending downwardly from said handle;
- 10 c) a pawl member having a slot therein said slot being defined in part by at least a rear wall portion, said pawl member further including a rail disposed on each lateral side thereof and extending outwardly therefrom, and a spring holding means provided in the rear of said pawl member;
- 15 d) a spring for biasing the pawl member to protrude from the housing slot;
- e) wherein said handle tab portion protrudes into said pawl member slot and engages said rear wall portion of said slot when the handle is lifted; and
- f) wherein said handle is pivotally connected to said housing to pivot along a pivot axis and wherein said tab portion is disposed at a location on said handle body 15 radially offset from said pivot axis.

13. The latch assembly of claim 12, wherein said housing further comprises handle supporting means including supporting elements provided on the housing.

14. The latch assembly of claim 12, wherein said housing further comprises mounting means for mounting said latch to said closure panel.

20 15. The latch assembly of claim 14, wherein the latch is provided for installation in an opening provided in the closure panel the opening being defined by an edge thereabout, wherein said housing further comprises a mounting flange and wherein said mounting means includes mounting elements extending from said housing disposed below said mounting flange, wherein said mounting elements retain said latch assembly on said closure 25 panel.

16. The latch assembly of claim 15, wherein said mounting elements comprise a pair of outwardly protruding members disposed on said housing on opposite sides of said housing slot and a spring element provided on the rear of said housing, said spring element having a first end attached to said housing and a second end having a notch for engagement with the 30 edge of the closure panel opening.

17. The latch assembly of claim 16, wherein said pawl member further includes an engaging foot for engagement with a keeper member.

18. The latch assembly of claim 12, wherein the housing further comprises a surrounding flange disposed below the handle.

19. The latch assembly of claim 1, further comprising locking means.
20. The latch assembly of claim 19, wherein said locking means comprises a lockplug disposed in said latch assembly which locks said handle to prevent actuation of the latch.
21. The latch assembly of claim 12, wherein said spring holding means comprises a board disposed in said pawl.
5
22. The latch assembly of claim 12, wherein said spring holding means comprises a projection extending from said pawl.
23. The latch assembly of claim 1, further comprising means for facilitating latching engagement where a closure panel is misaligned.
- 10 24. The latch assembly of claim 23, wherein said pawl has an engaging foot and wherein said means for facilitating latching engagement comprises a taper provided on said engaging foot.
25. The latch assembly of claim 1, further comprising detent means for maintaining the handle in a preferred position.
- 15 26. The latch assembly of claim 1, further comprising drag means for imparting a resistance to said handle as said handle is pivoted.
27. The latch assembly of claim 1, wherein said biasing means biases said handle to a closed position.
28. The latch assembly of claim 27, wherein said biasing means comprises a spring
20 which is connected to both said pawl member and said handle tab portion.

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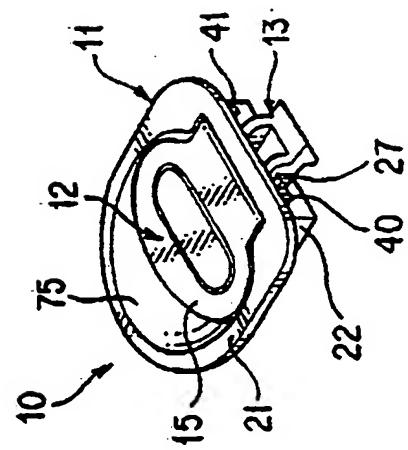


FIG. 1

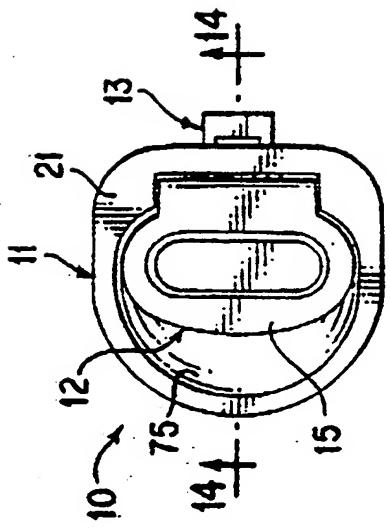


FIG. 2

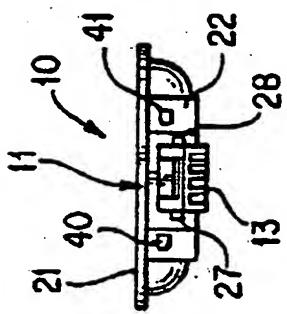


FIG. 3

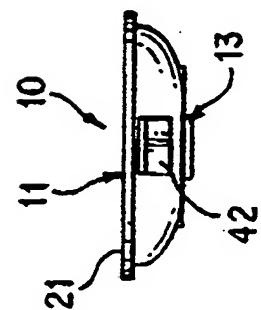


FIG. 4

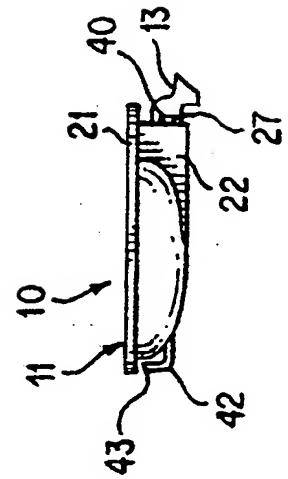


FIG. 5

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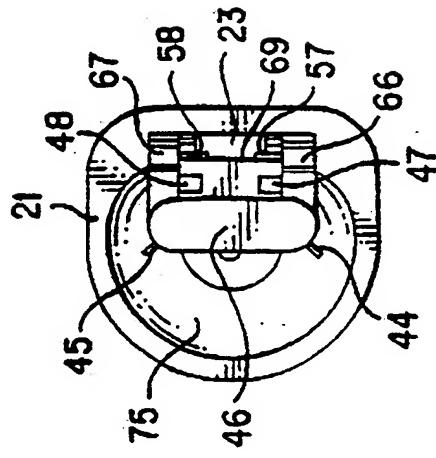


FIG. 7

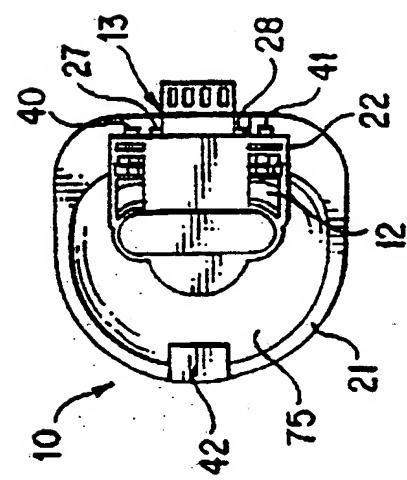


FIG. 6

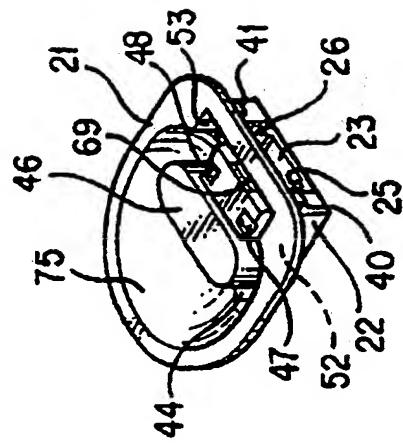


FIG. 8

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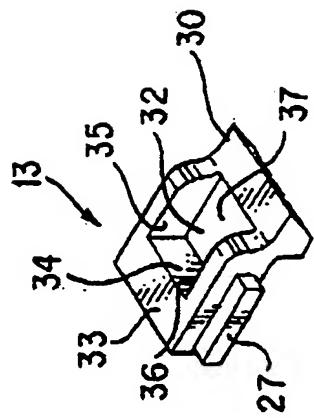


FIG. 9

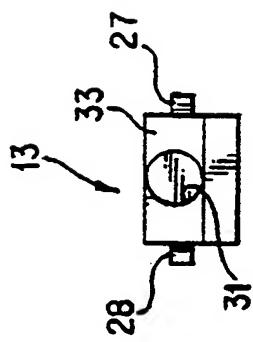


FIG. 10

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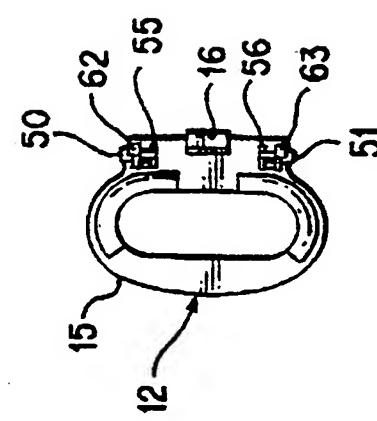


FIG. 12

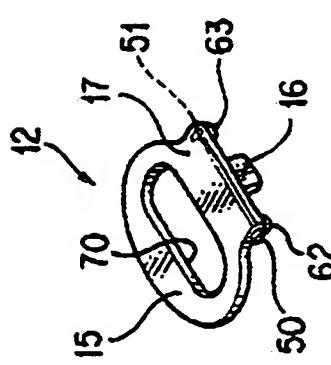


FIG. 11

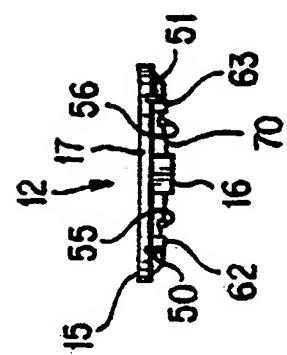


FIG. 13

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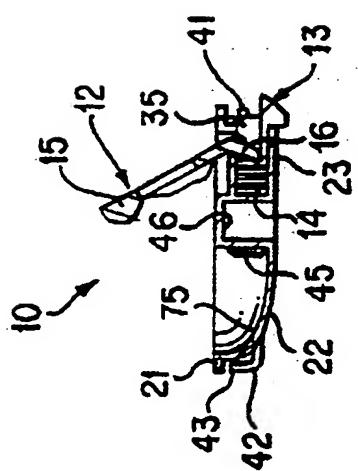


FIG. 15

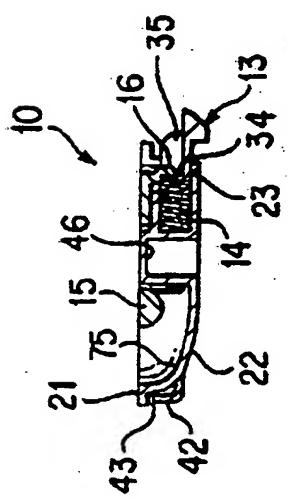


FIG. 14

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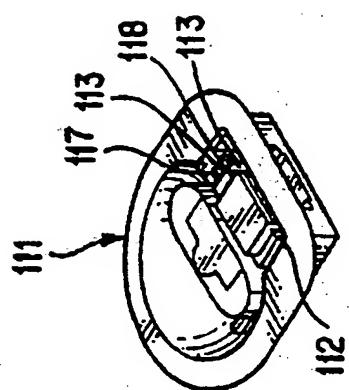


FIG. 17

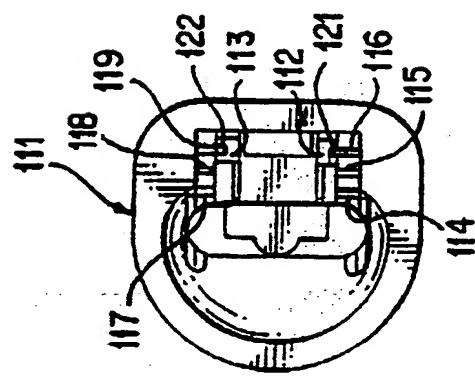


FIG. 16

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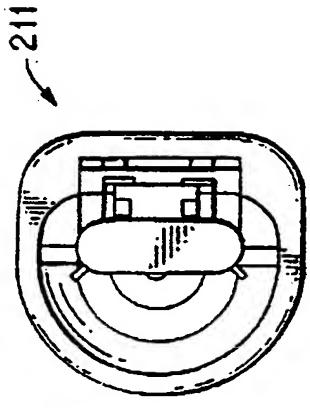


FIG. 18

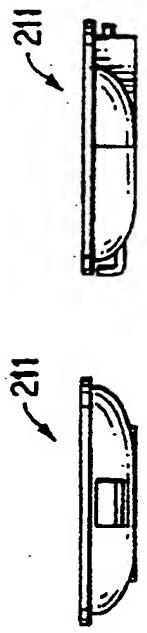


FIG. 19

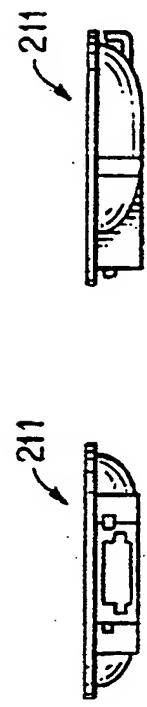


FIG. 20

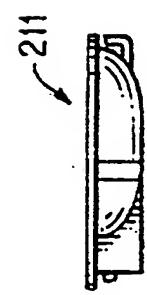


FIG. 21

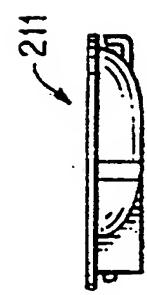


FIG. 22

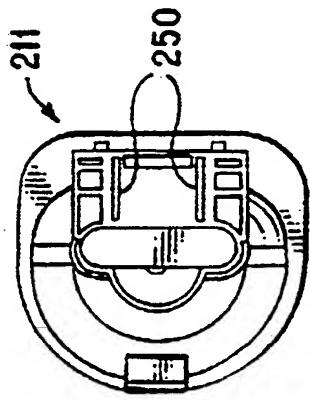


FIG. 23

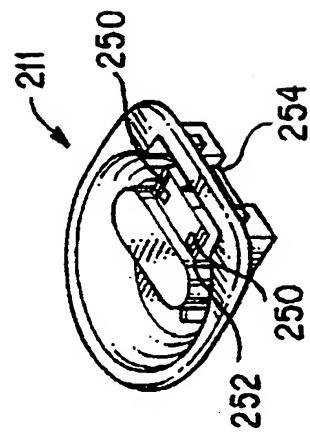


FIG. 24

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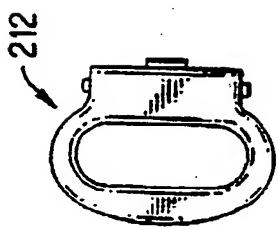


FIG. 25

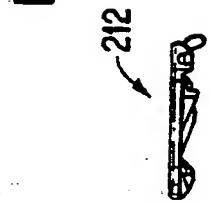


FIG. 27

FIG. 28



FIG. 29

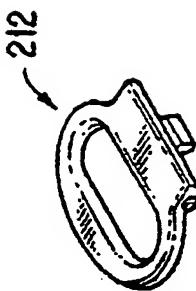


FIG. 31

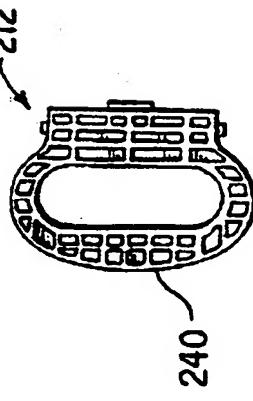


FIG. 30

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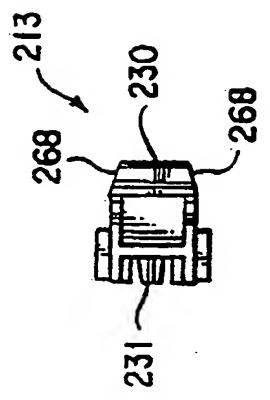


FIG. 32

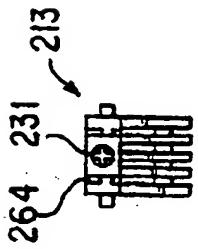


FIG. 33

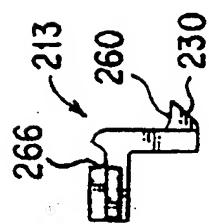


FIG. 34

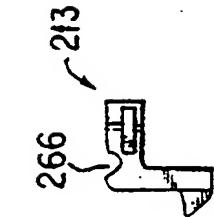


FIG. 35

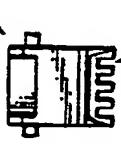


FIG. 36

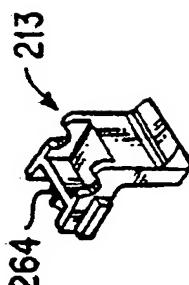


FIG. 37

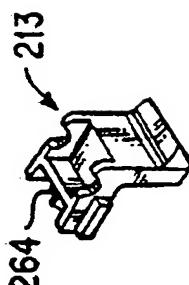


FIG. 38

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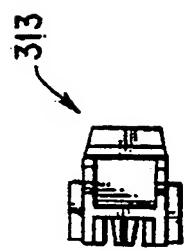


FIG. 39

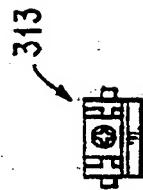
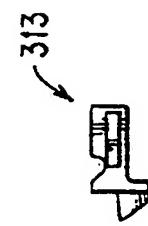


FIG. 40

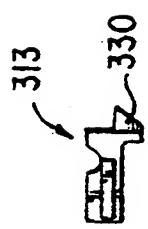


FIG. 41

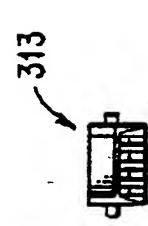


FIG. 42

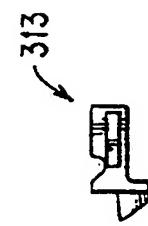


FIG. 43

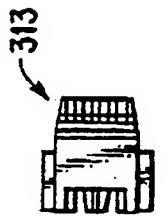
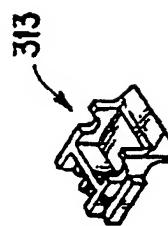


FIG. 44

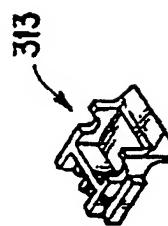


FIG. 45

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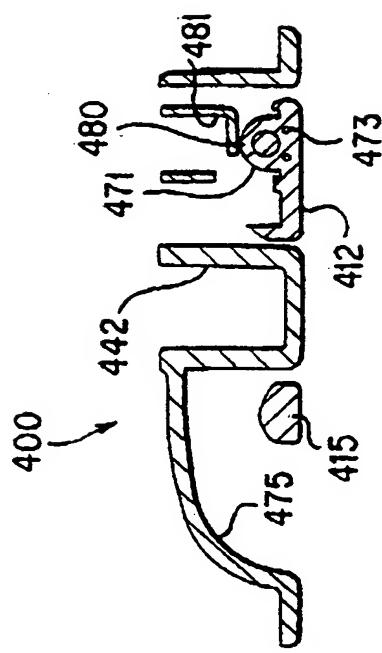


FIG. 48

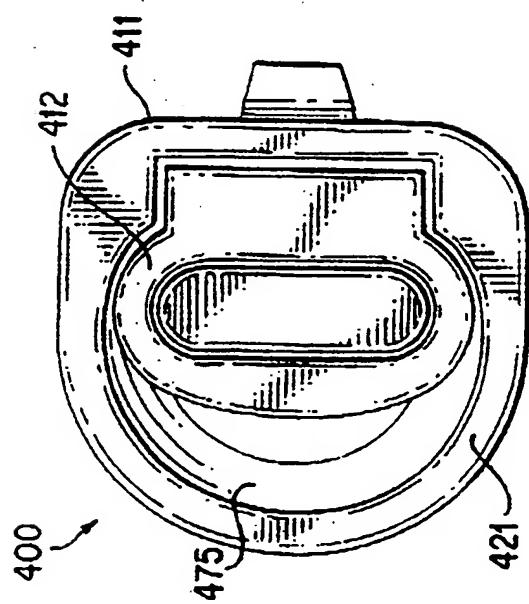


FIG. 46

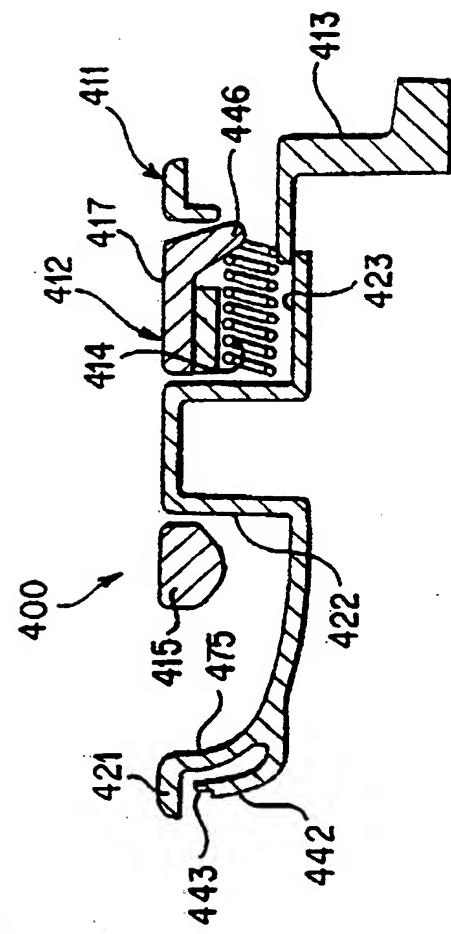


FIG. 47

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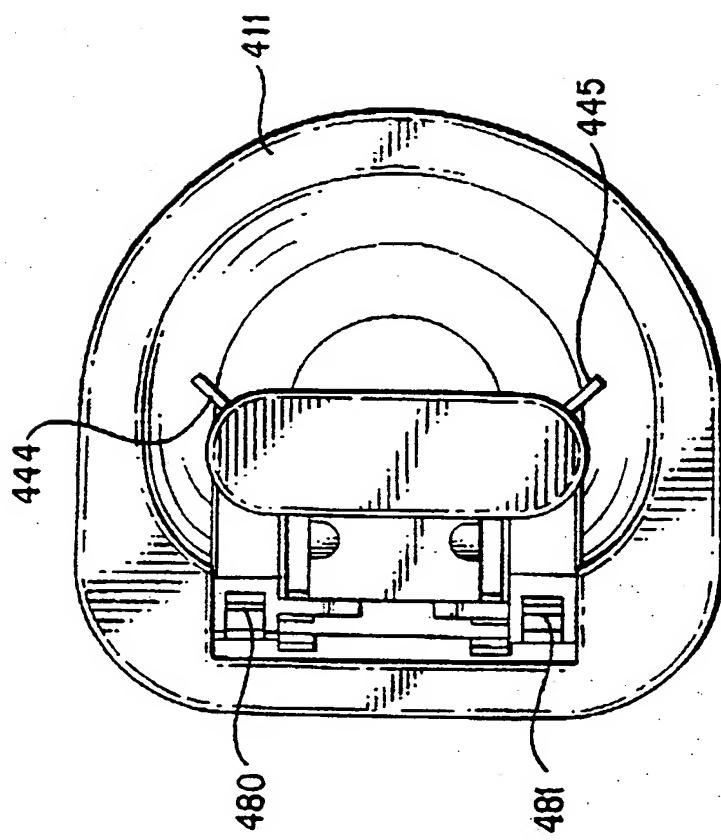


FIG. 49

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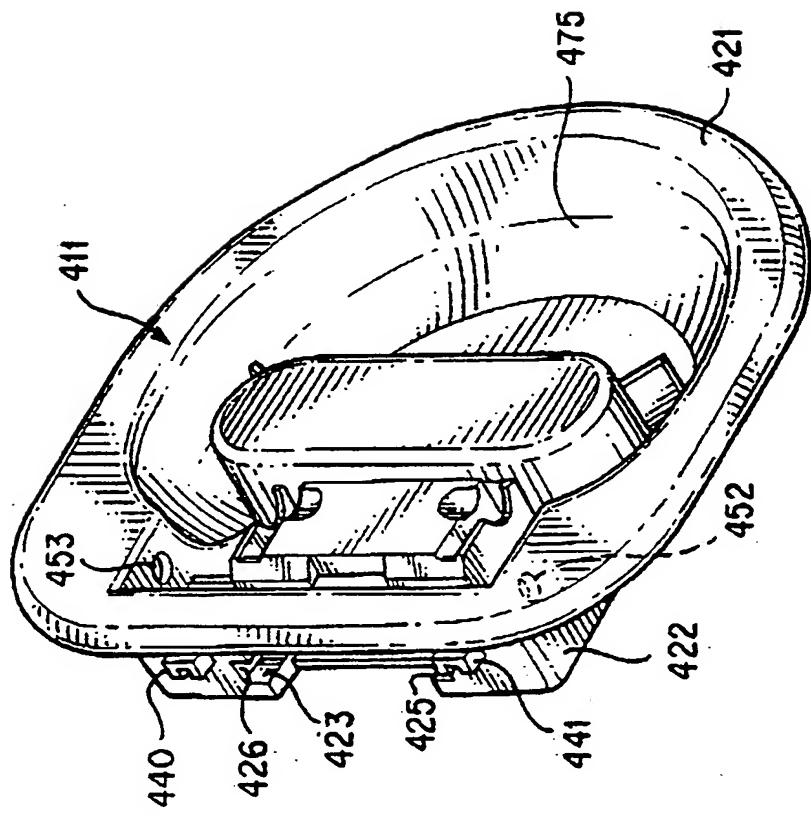


FIG. 50

SUBSTITUTE SHEET (RULE 26)

14/15

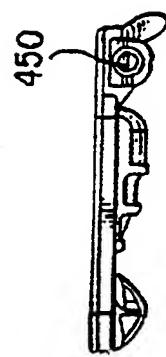


FIG. 52

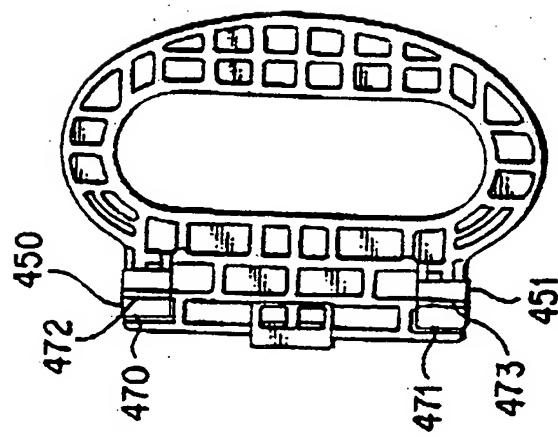


FIG. 51

SUBSTITUTE SHEET (RULE 26)

15/15

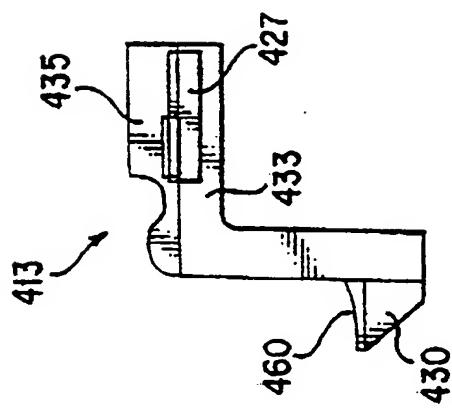


FIG. 54

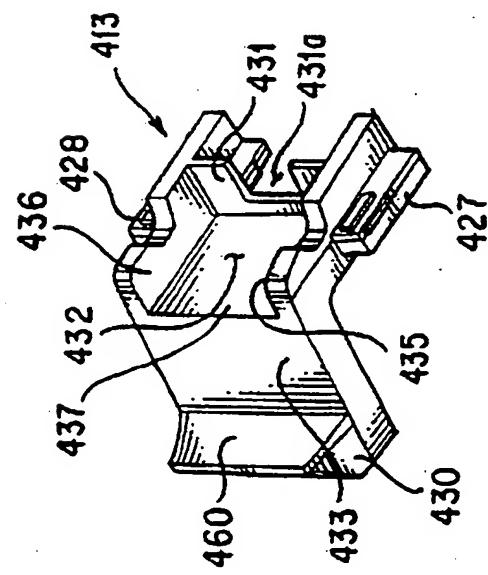


FIG. 53

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US99/22609

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : E05C 1/12
US CL : 292/173, 163, Dig. 31

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 292/173, 163, 175, 165, 169, 140, 143, 145, 146, Dig. 31, Dig. 38

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2,642,300 A (PELCIN) 16 June 1953 (16.06.1953), see Figs. 2 and 4	1-4, 6, 11-15, 18-22, 27
Y	US 5,292,159 A (SANDHU et al.) 08 March 1994 (08.03.1994), column 2, lines 51-56 and Fig. 2	1-6, 11-15, 18-22, 27
Y	US 3,081,617 A (McKAY) 19 March 1963 (19.03.1963), Figs. 3 and 4	1-6, 11-15, 18-22, 27
Y	US 1,877,612 A (STIEGLITZ) 13 September 1932 (13.09.1932), Figs. 1, 2, 5	14, 15
Y	US 3,495,862 A (McCLINTOCK) 17 February 1970 (17.02.1970) Figs. 4 and 5	21, 22
A	US 4,138,869 A (PELCIN) 13 February 1979 (13.02.1979), see entire document	1, 12
A	US 2,987,908 A (PELCIN) 13 June 1961 (13.06.1961), see entire document	1, 12
A	US 2,721,751 A (HOLRITZ) 25 October 1955 (25.10.1955), see entire document	1, 12
A	US 3,449,005 A (PASTVA, Jr.) 10 June 1969 (10.06.1969), see entire document	1, 12
A	US 2,916,905 A (PODLESAK) 15 December 1959 (15.12.1959), see entire document	1, 12
A	US 3,707,862 A (PASTVA, Jr.) 02 January 1973 (02.01.1973), see entire document	1, 12
A	US 2,649,322 A (MACK) 18 August 1953 (18.08.1953), see entire document	1, 12
A	US 2,840,407 A (SELLON, Jr.) 24 June 1958 (24.06.1958), see entire document	1, 12
A	US 3,743,336 A (ANDREWS) 03 July 1973 (03.07.1973), see entire document	1, 12
A	US 5,484,178 A (SANDHU et al.) 16 January 1996 (16.01.1996), see entire document	1, 12
A	US 4,116,027 A (TANNERY) 26 September 1978 (26.09.1978), see entire document	1, 12
A	US 2,608,085 A (CASTLE) 26 August 1952 (26.08.1952), see entire document	1, 12



Further documents are listed in the continuation of Box C.



See patent family annex.

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"E"	earlier application or patent published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search 09 December 1999 (09.12.1999)	Date of mailing of the international search report 03 FEB 2000
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703)305-3230	Authorized officer Teri Pham <i>Diane Smith for</i> Telephone No. (703) 305-7421

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US99/22609

C (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No
A	US 3,871,198 A (MILLER) 18 March 1975 (18.03.1975), see entire document	1, 12
A	US 3,782,141 A (DOERRFELD) 01 January 1974 (01.01.1974), see entire document	1, 12
A	US 3,494,650 A (SLOPA) 10 February 1970 (10.02.1970), see entire document	1, 12

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